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EXAMINER

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ART UNIT

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Please find below and/or attached an Office communication concerning this application or proceeding.



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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/017,483
Filing Date: December 14, 2001
Appellant(s): WARDROP ET AL.

Seed Intellectual Property Law Group PLLC
For Appellant

EXAMINER'S ANSWER

MAILED

OCT 20 2004

GROUP 1700

This is in response to the appeal brief filed 08/16/04.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellant's brief includes a statement that the instant claims do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) *Prior Art of Record*

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

This rejection is set forth in a prior Office Action, mailed on 11/11/03.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
3. Claims 1-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keller et al 3850695 in view of European document EP-982788.

Regarding claim 1:

Keller et al disclose a voltage regulator system for use with fuel cell battery (TITLE) wherein the fuel cell battery system comprises a load circuit 1 including a fuel cell battery 2 (COL 1, lines 55-60); transistor 43 and 64 (COL 5, lines 17-20/ COL 6, line 6-10); and the load 3

Art Unit: 1745

(COL 1, lines 59-63). It is further disclosed that the voltage regulator system for a load circuit energized by a fuel cell battery comprises control means 5 arranged to energize the electric motor (another load coupled to the fuel cell system) and monitoring means 4 responsive to the current drawn by the load circuit and having an output switch 33 adapted to be switched from a rest condition to an operated condition whenever a particular specific quantity of electricity has passed through said load (CLAIM 1); a circuit connected to said fuel cell battery 2 for supplying power to a load 3 including, a main switch between the fuel cell battery and the monitoring means, a measuring element 31 forming part of the monitoring means, and the switch path of an electrically controllable switch (CLAIM 1); means for supplying a control voltage necessary to make said switching path of the electrically controllable switch conducting initially in response to the closing thereof and to maintain the switching path conducting responsive to the condition of the portion of the load circuit on the load side of the electrically controllable switch, the voltage across said portion of said load circuit also serving as a supply voltage for activating elements of the monitoring means other than the measuring element thereof (CLAIM 1).

- 45 1. A voltage regulator system for a load circuit (1) energized by a fuel cell battery (2) comprising:
a battery fuel storage tank (9);
means including a pump (8) for supplying fuel from
said tank to said battery;
50 an electric motor (7) for driving said pump;
control means (5) arranged to energize said electric motor;
monitoring means (4) responsive to the current drawn by said load circuit and having an output
55 switch (33) adapted to be switched from a rest condition to an operated condition whenever a particular specific quantity of electricity has passed through said load;
a circuit connected to said battery (2) for supplying
60 power to a load (3) including, in series, a main switch (13) between said battery (2) and said monitoring means (4), a measuring element (31) forming part of said monitoring means, and the switching path (14-15) of an electrically controllable
65 switch (16);
means for supplying a control voltage necessary to make said switching path (14-15) of said electrically controllable switch (16) conducting initially

Art Unit: 1745

in response to the closing of said main switch (13) and to maintain said switching path conducting in response to the condition of the portion of said load circuit (1) on the load side of said electrically controllable switch (16), the voltage across said portion of said load circuit also serving as a supply voltage for activating elements of said monitoring means other than said measuring element thereof; and
connecting circuit means for causing said control means to activate said motor every time said output switch is switched to its operated condition, to reset said output switch to its rest condition and after an interval to deenergize said motor, said connecting circuit means including a monostable flip-flop (12) for producing control pulses, the duration of which determines the intervals during which said motor is energized and said pump is in operation.

It is further disclosed that the output switch of the monitoring means is a voltage sensitive switch responsive to the voltage varying with the integrated value and adapted to switch to its operated condition when said varying voltage reaches a threshold value (CLAIM 11), in which further said particular quantity of electricity is determined by the threshold value of the varying voltage (CLAIM 11).

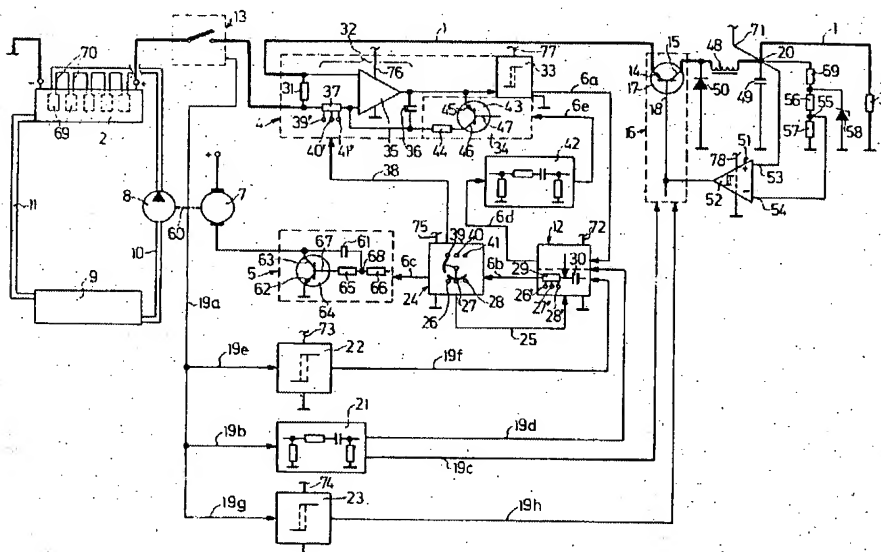
11. A voltage regulator system as defined in claim 1 in which said monitoring means (4) includes a measuring resistor (31) in series in said load circuit, in which further the voltage drop produced by the current through said measuring resistor is provided to an integrator (32), in which further said output switch (33) of said monitoring means (4) is a voltage sensitive switch responsive to the voltage varying with the integrated value as formed by said integrator (32) and adapted to switch to its operated condition when said varying voltage reaches a threshold value, in which further said particular specific quantity of electricity referred to in claim 1 is determined by said threshold value of said varying voltage, and in which a reset means (34) responsive to operation of said output switch (33) is provided in said monitoring means for resetting said integrator (32).

With respect to claim 2:

Keller et al disclose that the fuel cell battery comprises individual cells, which are connected by individual branches. This is feasible because it provides a fuel cell assembly without the occurrence of disturbing losses from bridging of the individual cell (COL 6, lines 24-35). Thus, the second set of fuel cell and electrical features are inherently recited.

On the matter of claims 3-4:

Figure 1 below gives a picture of a schematic diagram of a regulator system according to Keller et al's invention and shows the load is located upstream downstream from the fuel cell in an air flow communication therewith and proximate to the fuel cell.



In reference to claim 5:

Keller et al teach several capacitors (COL 4, lines 1-5/ Col 5, lines 25-28 and lines 37-40/ CLAIMS 12 and 15-16).

As far as claim 6:

Keller et al teach an inductor (Col 5, lines 37-40/ CLAIM 15).

On the subject of claims 7 and 9:

Keller et al reveals the use of an npn transistor (COL 6, lines 6-10) as well as a pnp transistor (COL 2, line33-35/COL 5, lines 17-18).

Keller et al disclose a voltage regulator system for use with fuel cell batteries according to the aforementioned aspects. Nevertheless, Keller et al do not expressly disclose the fuel cells being made of a solid polymer; and the specific load-resistor response.

The EP'788 document discloses fuel cells as a power source using solid polymer electrolyte (SECTION 0003 and 0005) and wherein the fuel cell system comprises an apparatus for safeguarding fuel cells against reverse polarization damage by monitoring the fuel cells in a stack thereof and alerting the stack's operator and/or initiating corrective measures to protect failing cells in the stack when undesirable stack operating conditions are indicated (SECTION 0001).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the solid polymer electrolyte fuel cell of the EP'788 document in the fuel cell system of Keller et al as the EP'788 discloses that fuel cells comprising solid polymer electrolyte has been used as a power source for many applications because they have high energy and low weight. Furthermore, the EP'788 directly teaches the use of solid polymer fuel cells for power source applications including safeguarding and monitoring the fuel cells to initiate corrective measures to protect failing cells when undesirable stack operating conditions are indicated. Consequently, the teachings of the EP'788 document are consistent with Keller et al's teaching of providing fuel cell detecting, monitoring and controlling features.

With respect to the specific load-resistor response, it would have been obvious to one skilled in the art at the time the invention was made to reverse the specific load-resistor response of the fuel cell system of Keller et al because Keller et al themselves disclose coupling a load to the fuel cell stack when the output voltage falls below the threshold value and thus, uncoupling the load from the fuel cell stack when the output voltage exceeds the threshold value and therefore, one of ordinary skill would envision that such opposite functionality could be an obvious variation of the claimed invention as it will only be necessary to reset the fuel cell

Art Unit: 1745

control system parameter to operate in an opposite fashion to satisfy the claimed requirement.

Thus, it is within the level of ordinary engineering skill to reverse a function or adjust a controlling signal for responding to an opposite criteria or parameter

(11) Response to Argument

Appellants' arguments have been fully considered but they are not persuasive in overcoming the foregoing ground of rejection.

The main contention of applicants' arguments is premised on the assertion that the prior art's teaching is in direct contrast to the limitations recited in the instant claims, for instance, a first transistor being responsive to the stack terminal voltage to selectively couple the first dump load in parallel with the first set of fuel cells when the stack terminal voltage exceeds a threshold voltage and to uncouple the first dump load when the stack terminal voltage is below the threshold voltage. However, this assertion is not sufficient to overcome the rejection. In this regard, it is first noted that applicants did agree with the fact that the prior art instructs the skilled artisan to coupling a load to the fuel cell stack when the output voltage falls below the threshold value and thus, uncoupling the load from the fuel cell stack when the output voltage exceeds the threshold value. Refer to Appellant's Brief of 08/16/04, paragraph bridging pages 11-12, and to the Response under 37 CFR 1.116 of 01/22/04 at page 3, 1st full paragraph (*i.e.* "Keller teaches increasing the power motor to the motor 7 in response to the output voltage falling below a defined threshold. Keller, col. 2, line 60-col. 3, line 5, and col. 7, line 66-col. 8, line 8. The power is increased by increasing the duration and/or frequency of the electrical coupling of the motor to the fuel cell battery. *Id.* Thus, Keller teaches coupling the motor 7 to the fuel cell stack

Art Unit: 1745

2 when the output voltage falls below the threshold value and ipso facto uncoupling the motor from the power source when the output voltage exceeds the threshold value. This operation "results in providing additional supply of fuel to the fuel cell battery 2" Keller, col. 8, lines 4-8 (emphasis added). Consequently, the fuel cell battery 2 will produce more power, resulting in a higher voltage on the outputs bus"). Accordingly, the prior art clearly discloses the functional relationship of either coupling or uncoupling in response to fuel cell operational conditions or modes. Having said that, the question to answer now is whether or not one of ordinary skill in the art would have sufficient sophistication to implement a reversed functionality based on the foregoing teachings. In order to answer this question, it is secondly noted that the prior art itself does not teach, suggest or reveal that an opposite functionality or behavior of its fuel cell system will definitely cause detrimental damages to the fuel cell system as a whole, therefore, one of ordinary skill would envision that such opposite functionality could be an obvious variation of the claimed invention as it will only be necessary to reset the fuel cell control system and its parameter(s) to operate in an opposite fashion to satisfy the claimed requirement.

Moreover, where functional language is used in an apparatus claim, the burden shifts to applicant to establish that the disclosed apparatus does not and cannot function in the manner required by the claims. Given that the cited prior art is indicative of the level of ordinary skill someone possesses (i.e. coupling or uncoupling a load in response to fuel cell operational conditions or modes), it is noted that resetting the load to couple/uncouple responsive to the fuel cell operational mode would not result in such catastrophic runaway of the system as argued by the applicants because if serious, significant or a large number of unsatisfactory problems were readily apparent, the prior art would have reported or addressed them. Since applicants have not

Art Unit: 1745

provided objective evidence demonstrating that the fuel cell apparatus of the prior art cannot perform as claimed, or a reversed functional modification of its control system would cause such detrimental/catastrophic damages thereto, it is noted that this assertion appears to be solely based on applicants' own understanding of how the system should respond or behave. For that reason, the arguments of counsel cannot take the place of evidence in the record. An assertion of what seems to follow from common experience is just attorney argument and not the kind of factual evidence that is required to rebut a prima facie case of inherent anticipation/obviousness (See *MPEP 716.01 and 2145: Consideration of Applicant's Rebuttal Arguments*). That is to say, a statement or argument by the attorney is not factual evidence.

Furthermore, it is within the level of ordinary engineering skill to reverse a function or adjust a controlling signal for responding to an opposite criteria or parameter. It has been held that adjusting functional requirements and/or reversing functions are prima facie case of obviousness. (Reversal of Parts: In re Gazda 104 USPQ 400). Additionally, it has been held that re-arrangement of parts is obvious. Succinctly stated, fact that a claimed feature/element is structurally re-arranged, or reversed is not sufficient by itself to patentably distinguish over an otherwise old feature unless there are new or unexpected results as it is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed load circuit was significant. In re Japikse 86 USPQ 70. In re Kuhle 188 USPQ 7. In re Gazda 104 USPQ 400 (*Refer to MPEP 2144.04 [R-1] Legal Precedent as Source of Supporting Rationale: VI. Reversal, Duplication, OR Rearrangement of Parts*). Further, the manner in which an apparatus operates is not germane to the issue of patentability of the apparatus itself unless a different structural feature distinguishes the

Art Unit: 1745

apparatus from the prior art as apparatus claims cover what a device is, not what a device does.

Ex parte Wikdhahl 10 USPQ 2d 1546. Ex parte McCullough 7 USPQ 2d 1889, 1891. In Re Finsterwalder 168 USPQ 530. In re Casey 152 USPQ 235, 238. An apparatus claim cover what a device is, not what a device does. Hewlett-Packard Co. v. Bausch & Lomb Inc 15 USPQ 2d 1525. Demaco Corp. v. F.Von Langsdorf Licensing Ltd. 7 USPQ 2d 1222, 1224-1225.

With respect to the dump load, the appellant (applicant) has previously contended the term "dump load" strictly refers to a resistive element such as a resistor for thermally dissipating excess of power in the form of heat. In that, the examiner asserted that the term "dump load" has been interpreted as any conventional load element because even though the specification appears to define the term "dump load", the specification also encompasses the possibility of including a capacitance (a capacitor) and/or an inductance (an inductor) as part of the dump load. Thus, it appears that the term "dump load" does not only refer to the resistive element but also to several other electrical features such as electrically powered elements or devices consuming electrical power as applicable. During prosecution, appellants (applicants) were encouraged to provide evidence or objectively indicate how the term "dump load" was conventionally interpreted in the electrical field as well as a clear indication of the specific novel feature/behavior/functionality that applicants intended to claim as the invention but such evidence was not provided or submitted. In consequence, the examiner has contended that the load feature of the '695 patent have substantially the same functionality as the claimed load feature in the instant application, and thus, the overall monitoring and voltage regulation system of the prior art is able to respond as presently claimed. In this regard, it is noted that the features upon which applicants relies (i.e. the load including resistive element such as resistor for thermally dissipating excess power, or

Art Unit: 1745

also including capacitive or inductive elements) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. Hence, the teachings of the prior art are fairly proportionate and commensurate, at least, to the instant claim language, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired.

In general, since there are insubstantial differences between fuel cell stack assembly of the prior art and the claimed fuel cell stack assembly, the burden is shifted to the applicants to provide objective evidence demonstrating that Keller et al's fuel cell when used as instantly intended in the present invention will indeed suffer detrimental effects. Unless applicants clearly differentiate the structure of the claimed fuel cell stack assembly from the structure of prior fuel cell, it is contended that, for practical purposes, the fuel cell of the prior art is able to implement the defined requisite functionality to satisfy the claimed requirement as the prior art features are a structural equivalent of the corresponding features claimed in the instant invention.

Furthermore, the combined applied art, directly teaches the use of solid polymer fuel cells for power source applications including safeguarding and monitoring the fuel cells to initiate corrective measures to protect failing cells when undesirable stack operating conditions are indicated. Consequently, such teachings are consistent with the claimed requirement of safeguarding and/or protecting the functionality the fuel cell stack assembly in response to significant variations of electrical conditions during operation thereof. Hence, absent further objective evidence (from the Appellants) of how the fuel cell stack assembly is, indeed, catastrophically and detrimentally affected by the disclosed reversed functionality, the examiner's position is found to be reasonable and valid because those of ordinary skill in the art

Art Unit: 1745

would clearly envision to couple/uncouple and use together voltage regulators or shunt regulating systems with fuel cells as these features/equipment are generally-conventionally separated or detached from each other so that their individual and particularized chemical environments does not necessarily interfere, affect or cause detrimental damages between them unless they are both integrally or internally manufactured, constructed, assembled or formed.

With respect to appellants' arguments regarding claim 2, it is noted that the prior art discloses fuel cell battery comprising individual cells, which are connected by individual branches; and that is feasible because it provides a fuel cell assembly without the occurrence of disturbing losses from bridging of the individual cell (COL 6, lines 24-35). Thus, the second set of fuel cell and electrical features are implicitly recited. Nevertheless, it has also been held that duplication of parts is obvious. Succinctly stated, fact that a claimed feature/element or member is duplicated is not sufficient by itself to patentably distinguish over an otherwise old feature unless there are new or unexpected results as it is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed second set of solid polymer electrochemical fuel cells and their associated equipment as significant. In re Harza 124 USPQ 378. (*Refer to MPEP 2144.04 [R-1] Legal Precedent as Source of Supporting Rationale: VI. Reversal, Duplication, OR Rearrangement of Parts*).

Regarding appellants' arguments concerning the remaining claims, (claims 3-4) Figure 1 above (Keller reference) gives a picture of a schematic diagram of a regulator system according to Keller et al's invention and shows the load is located upstream downstream from the fuel cell in an air flow communication therewith and proximate to the fuel cell; (claim 5) Keller et al

Art Unit: 1745

teach several capacitors (COL 4, lines 1-5/ Col 5, lines 25-28 and lines 37-40/ CLAIMS 12 and 15-16): (claim 6) Keller et al teach an inductor (Col 5, lines 37-40/ CLAIM 15); (claims 7 and 9) Keller et al reveals the use of an npn transistor (COL 6, lines 6-10) as well as a pnp transistor (COL 2, line33-35/COL 5, lines 17-18).



For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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